

Measure 3: Transit Ridership and Bus Volumes

Monitoring Objectives

The purpose of monitoring transit passenger and bus volumes is as follows:

- Provide data on bus volumes by street segment in downtown Seattle
- Measure the average weekday PM peak hour and weekday passenger loads crossing the Seattle CBD north-south screen line
- Provide data as available from Community Transit and Pierce Transit on average ridership crossing the north-south screen line during average PM peak hours and weekdays
- Identify and analyze any substantive changes in ridership or bus volumes for before and after tunnel closure conditions

Methodology

Baseline bus volumes used for this analysis were extracted from HASTUS - the King County Metro scheduling system - using the February 2005 service change. These counts included in-service as well as out of service coaches. A projection of bus volumes on downtown streets for after tunnel closure conditions for September 2006 was also issued with Volume 1, the Baseline Report. These projected bus volumes have subsequently been compared with actual bus volumes for all service changes that have occurred since tunnel closure. Volume 2 provided a comparison with bus volumes as of December 2005 that reflected routing adjustments made to address operating impacts on Stewart Street. Volume 3 provided a comparison with bus volumes from the February 2006 service changes. Volume 4 provided a comparison with bus volumes as of June 2006. Volume 5 provided a comparison with bus volumes as of the September 2006. With Volume 6, the comparison is with bus volumes from the February 2007 service change.

For passenger loads, the Automated Passenger Count (APC) system is the primary source for passenger data for Metro coaches. APC data is collected in a random sample during each signup, downloaded and processed monthly. This data is summarized in a final form at the end of each signup. Preliminary data, based on smaller samples, is available monthly. Metro driver count data is collected on an ad hoc basis when preliminary APC results indicate that observations of trips on a particular route will fall below an adequate sample. Ridership data on Community Transit and Pierce Transit service is generated by the monitor reports supplied by each of these agencies. The ridership data from Community Transit and Pierce Transit is available by signup at the aggregate level.

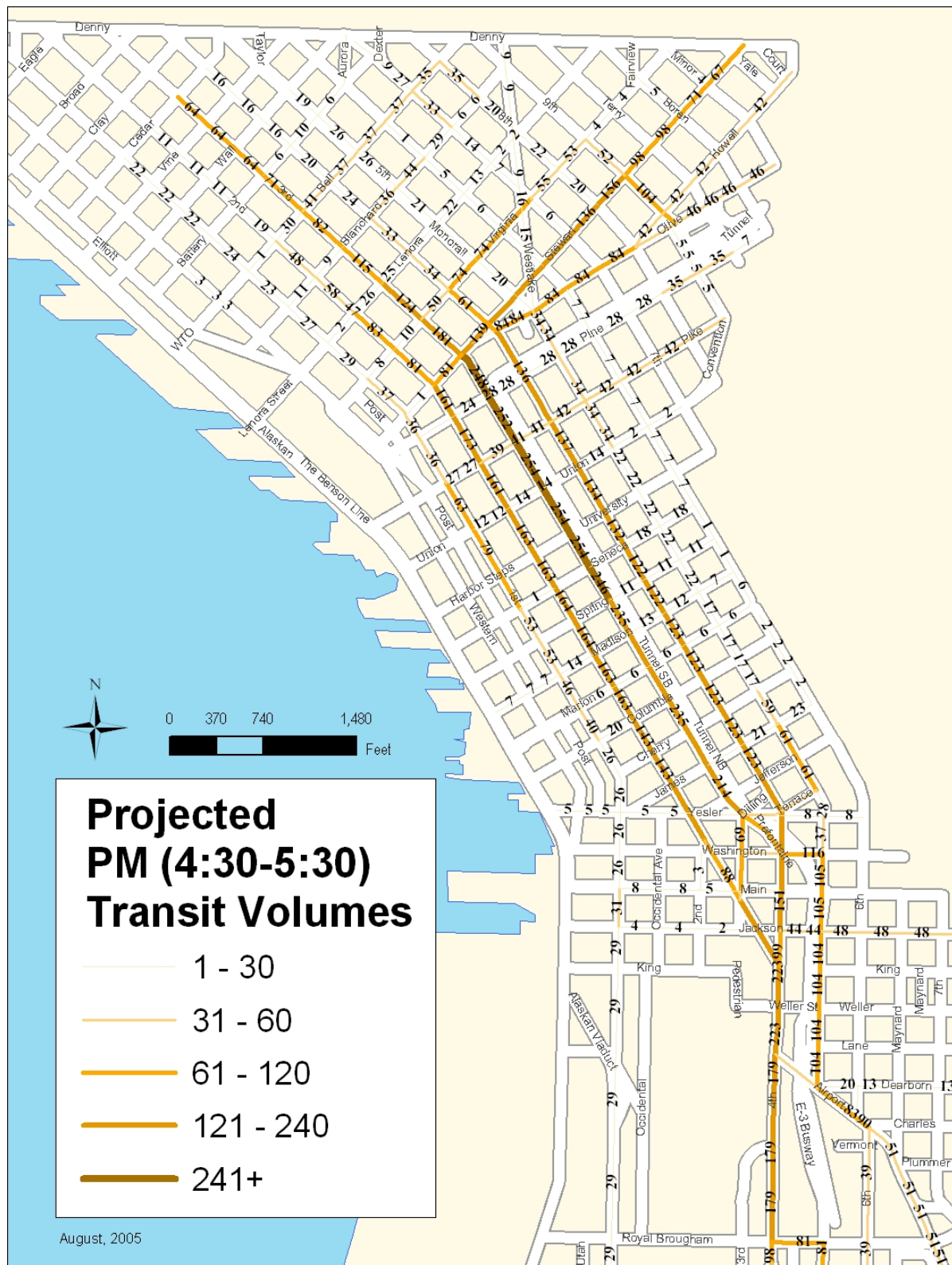
APC data, supplemented by driver counts and estimates for any non-APC observed trips, was used to estimate pre-tunnel closure Metro ridership volumes crossing the screen line just south of University Street by trip during the PM peak hour and the average weekday. These results were been summarized by street and by direction and have subsequently been used to assess changes in ridership volumes and loads since tunnel closure.

Bus Volumes

The bus volumes that were projected for downtown street segments during tunnel closure, as shown in the Volume 1 Baseline report, are summarized in Figure 5A. The actual post tunnel bus volumes for downtown streets for the February 2007 service change are shown in Figure 5B.

Bus volumes in the CBD during the PM Peak continue to be essentially the same for most links as projected. The PM Peak period used for determining transit volumes is 4:30 to 5:30 pm. Slight variations in volumes are due to schedule adjustments that change a trip from being included or excluded from the measured peak hour. The substantive changes for the baseline projection continue to be changes in bus volumes due to the relocation of selected trips from Second Avenue to Third Avenue, and the service adjustments on Stewart Street.

Figure 5A. PM Peak Hour Transit Volumes- Projected in September 2005 Baseline Report



Current PM (4:30-5:30) Transit Volumes

- 1 - 30
- 31 - 60
- 61 - 120
- 121 - 240
- 241+

XX 5+ increase over pre-tunnel projections

XX 5+ decrease over pre-tunnel projections

XX No or negligible change from pre-tunnel projections

June, 2007

Transit Ridership Volumes

Prior to tunnel closure, the primary concern regarding ridership was that ridership on transit trips entering the CBD might exceed the available capacity, leading to unacceptable overloads. To address this concern, University Street - approximately in the middle of the CBD - was used as a screenline, and the total volume of riders crossing this screenline, regardless of origin or destination, was measured for baseline (pre-closure) and current (post-closure) conditions.

Approximately 95,000 north-south riders crossed the downtown screenline at University Street on weekdays in fall 2004 before tunnel closure. As part of a general increase in ridership, this number increased to almost 106,700 weekday riders in spring 2005. Ridership data in spring 2007 indicate that loads have increased almost three percent since spring 2005, to 109,400 weekday riders. Overall ridership to and from the CBD has also increased even more in this period. The fact that the number of riders crossing the screenline has increased more slowly than the number entering and leaving the CBD is probably a result of three factors: (1) some riders leaving downtown who would have crossed the screenline if the tunnel was open are catching their trips after their bus crosses the screenline; (2) some riders entering downtown who would have stayed on their trips past the screenline if the tunnel was open are exiting before they reach University Street; and (3) some riders who would have used the tunnel for cross-CBD trips are not using surface buses as an alternative. In other words, although surface travel times have improved in the CBD since tunnel closure, surface travel times are still slower than tunnel travel times and it is likely that some potential cross-CBD trips are not occurring because they take longer on the surface than they would in the tunnel.

Figure 6 compares spring 2007 ridership at University Street with the baseline spring 2005 loads. Average weekday loads increased by approximately 2.6 percent. However, the total load crossing the screenline during the peak hour from 4:30 to 5:30 pm decreased by about 13 percent. The decline in the peak period indicates that, as mentioned above, a significant number of commuter riders are catching their outbound buses after those coaches cross the screenline.

Figure 6. Passenger Loads at University Street, before and after Tunnel Closure

		Weekday Riders		Change	1-Hr PM Peak Riders		Change
Avenue	Dir	Spring 2005	Spring 2007		Spring 2005	Spring 2007	
First	N	9,861	10,708	+8.6%	757	790	+4.4%
	S	6,002	5,892	-1.8%	469	650	+38.6%
Second	S	14,794	15,859	+7.2%	2,465	1,544	-37.4%
Third	N	17,849	29,273	+64.0%	1,478	2,681	+81.4%
	S	17,239	26,056	+51.1%	1,883	2,892	+53.6%
Fourth	N	10,375	16,894	+62.8%	825	913	+10.7%
Fifth	S	3,046	4,730	+55.3%	155	257	+65.8%
Tunnel	N	12,991	N.A.		1,188	N.A.	
	S	14,495	N.A.		1,959	N.A.	
Total		106,651	109,411	+2.6%	11,179	9,727	-13.0%

Figure 7 compares spring 2007 data for standing loads at University Street with the baseline spring 2005 standing loads. The overall incidence of standing loads is at or below pre-tunnel closure levels, both during the entire weekday and during the peak 1-hr. Average weekday loads greater than seating capacity have increased in incidence on Second Avenue, as did the PM peak hour loads on First Avenue northbound. Spring 2007 data indicated one trip with an average load of more than 20 percent over seating capacity on First Avenue northbound during the PM peak hour. These statistics represent a small number of observations of a small number of trips, and are well below the level of concern.

Figure 7. Loads over Seating Capacity at University Street, before and after Tunnel Closure

		Average Loads Greater than Seat Capacity				Average Loads 20% over Seating Capacity			
		% of Weekday Trips		% of Peak 1-Hr Trips		% of Weekday Trips		% of Peak 1-Hr Trips	
Avenue	Dir	Spring 05	Spring 07	Spring 05	Spring 07	Spring 05	Spring 07	Spring 05	Spring 07
First	N	1.8%	1.5%	7.5%	8.1%	0.0%	0.4%	0.0%	2.7%
	S	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Second	S	0.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third	N	1.2%	1.2%	1.5%	0.0%	0.2%	0.2%	0.0%	0.0%
	S	5.0%	1.6%	4.7%	2.8%	1.3%	0.1%	1.6%	0.0%
Fourth	N	0.5%	0.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
Fifth	S	0.8%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
Tunnel	N	0.4%	N.A.	0.0%	N.A.	0.0%	N.A.	0.0%	N.A.
	S	0.2%	N.A.	0.0%	N.A.	0.0%	N.A.	0.0%	N.A.
Total		1.3%	0.9%	1.4%	1.4%	0.3%	0.1%	0.2%	0.2%

Ridership crossing the University Street screenline is slightly higher than pre-closure levels. However, data from screenlines at the edges of the CBD indicate that loads leaving the CBD have increased substantially since spring 2005, from 90,800 to 105,700 riders each weekday, including loads on Community Transit and Pierce Transit-operated services. Similarly, loads entering the CBD increased from about 88,000 in spring 2005 to about 105,700 in spring 2007. With tunnel reopening, ridership crossing the University Street screenline may rise sharply as passengers take more cross-CBD trips, especially if the current higher speeds (and associated cross-CBD trips) on Third Avenue can also be maintained.

Standing loads have increased since spring 2005, although they are still a small fraction of outbound trips. Figure 8 compares the percent of trips with standing loads leaving downtown at various times of the day. The largest increase, not surprisingly, is in the PM peak, when 5.3 percent of trips leaving the Seattle CBD had standing loads, as compared to 3.4 percent of trips in spring 2005. This increase was spread across a number of routes, including ones not likely to be directly affected by tunnel closure, and is more likely related to the general rise in ridership over the past two years than to tunnel closure.

Figure 8. Percent of Trips Leaving CBD Averaging Standing Loads, before and after Tunnel Closure.

		AM Peak	Midday	PM Peak	Evening	Total
		6-9 AM	9AM–3 PM	3-7 PM	7-11 PM	
Standing Loads	Spring 2005	2.4%	2.7%	3.4%	0.3%	2.4%
	Spring 2007	3.3%	2.5%	5.3%	1.2%	3.6%
Over 120% Load	Spring 2005	0.0%	0.7%	0.5%	0.0%	0.4%
	Spring 2007	0.6%	0.4%	1.2%	0.0%	0.7%